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[Claim(s)]

A method for using a common process definition which consists of an arc combined with the 1st node relevant to the 1. 1st site characterized by comprising the following, the 2nd node relevant to the 2nd site, and said 1st and 2nd nodes, and harmonizing a process between the said 1st and 2nd site.

A step which performs said 1st node of said common process definition at said 1st site by performing the 1st exclusive process definition associated by common informations about said 1st node.

A step which performs said 2nd node of said common process definition at said 2nd site by performing the 2nd exclusive process definition associated by common informations about said 2nd node at the time of reception of a message defined by said arc.

2. Method of claim 1 that said arc is business object.

The 1st site characterized by comprising the following of 3. above.

A step which creates said common process definition.

A step which distributes said common process definition to said 2nd site.

A step which associates the 1st exclusive process definition that includes action preceded with transmission of a message from this 1st site by common informations at said 1st node at said 1st site.

Action which follows reception of a message by this 2nd site by common informations at said 2nd site at said 2nd node.

A method of claim 3 characterized by comprising the following.

4. Said step to distribute is further, A step which inspects said common process definition at said 2nd site

A step which transmits a recognition signal to said 1st site from said 2nd site when said common process definition is recognized at said 2nd site.

A step which transmits a disapprobatory signal to said 1st site from said 2nd site when said common process definition is not recognized at said 2nd site.

A step characterized by comprising the following which carries out the 5. aforementioned distribution is further, A step which transmits a commitment message to said 2nd site when a recognition signal from said 2nd site is received at said 1st site, and said 1st site

A step which installs said common process definition and said 1st exclusive process definition.

A step which installs said common process definition and said 2nd exclusive process

definition at said 2nd site when a commitment message from said 1st site is received at said 2nd site.

6. Method of claim 5 that it contains further step which transmits stop message to said 2nd site when said step to distribute receives disapprobatory signal from said 2nd site at said 1st site.

7. Method of claim 3 which contains further step which changes said common process definition into the 1st state machine, and step which changes said common process definition into the 2nd state machine at said 2nd site at said 1st site.

8. Step which records execution of the 1st node of said common process definition on the 1st processes run history, A method of claim 3 which contains further a step which records execution of the 2nd node of said common process definition on the 2nd processes run history, and a step which inspects the said 1st and 2nd processes run histories.

It is a method characterized by comprising the following for harmonizing a process between the 9. 1st site, and the 2nd site, Said 1st site

A step which creates a common process definition including an arc which intervenes between the 1st node relevant to this 1st site, the 2nd node relevant to said 2nd site, and said 1st node and said 2nd node.

A step which distributes said common process definition to said 2nd site.

A step which is a step which creates the 1st exclusive process definition associated by common informations about said 1st node at said 1st site, and consists of action preceded with transmission of a message from said 1st site being defined in this process definition.

It is a step which creates the 2nd exclusive process definition associated by common informations about said 2nd node at said 2nd site, and action following reception of a message by said 2nd site is defined in this process definition.

It is a method characterized by comprising the following for creating a process definition which controls a process between the 10. 1st site, and the 2nd site, Said 1st site

A step which creates a common process definition including an arc which intervenes between the 1st node relevant to this 1st site, the 2nd node relevant to said 2nd site, and said 1st node and said 2nd node.

A step which distributes said common process definition to said 2nd site.

A step which is a step which creates the 1st exclusive process definition associated by common informations about said 1st node at said 1st site, and consists of action preceded with transmission of a message from said 1st site being defined in this process.

It is a step which creates the 2nd exclusive process definition associated by common informations about said 2nd node at said 2nd site, and action following reception of a message by said 2nd site is defined in this process.

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#### [Detailed Description of the Invention]

Name of an invention A system and a method for creating, performing and maintaining the process between companies Field of a background 1. invention of an invention Especially this invention relates to the system and method of enabling cooperation (harmonious operation) of the work between distributed information systems in relation

to an information system generally.

2. Explanation of pertinent art Change of the structure of the latest business organization from a company (enterprise) object to the independent single two or more interdependence type business entity, The similar development in the computer system from a single mainframe to the distributed network which consists of a personal computer and a workstation is reflected. since a computer network is very efficient for exchanging information between the dispersed sites or doing work -- a present-day network -- being also indistinguishable -- there is nothing and it is a useful product of this technical innovation. For example, the everyday work of placing an order for shopping or checking it can be automatically done between the existing systems by a share computer network. However, since many faults exist in this art, sufficient development of the conventional network technology for company internal use ways has been barred.

The most urgent problem that appears by using a share network among business partners, (1) a boundary legal [ between the communication security between that a partner's (partner) computer system is not unified, that the data which (2) partners' system uses is not unified, and (3) systems, reliability, and (4) partners ], systematic, and cultural -- come out.

It is related inharmonious [ a system ] and the company (organism) is using it, often combining the operating system, middleware system, and software application which are mutually incompatible. Although the middleware which spread widely is being arranged still now, the interoperability between pacesetting camps must still be specified fully.

Especially the thing with difficult solution is the difference by an application level, and, probably, it continues existing as the issue fundamental and solved over a long period of time.

About the 2nd problem that data is inharmonious, the user of different applications and those applications uses the information on a kind which expresses information although the same task is often performed, or is different by a different method in it. These differences will be able to become serious especially, when distributing among the companies where applications differ from those users. In order to bury the difference in the related syntax in information, and a meaning, what combined conversion capability and an intermediate object is needed.

About the 3rd problem of communication security and reliability, it is required for any dialog between the systems of a business network to be reliable and for a safe communication path to exist among participants. The problem about safety is especially serious when the Internet is used as a link within a communication path. It is because these media tend to receive tapping and the security attack of other gestalten.

It is performing efforts to automate the business (business) process between two or more partners about the 4th problem, and the obstacle of many which are not technical relevant to management of the project distributed in two or more organizations must be conquered. The difference between the mismatch in the priority of a project and assignment of a resource, the barrier by the difference in language, and a time zone and regulation by both a company and the government are included in these technical problems. The collaboration level which can be attained is restricted by these technical problems. Therefore, if technical solution is not what doubled the focus with making into the minimum the mutual range and complexity of predefined significance which are needed in order to implement this solution, it will not become.

At least five methods are known as a method for extending an interdependence process to other systems connected by the conventional computer network resource at present exceeding one computer system. The 1st is hand-control approach with which the user of two or more computer systems exchanges information mutually via a telephone, fax, or other media. The exchanged information is inputted into each computer system by the help next. This hand-control approach can be used in order to bury the difference in automation, but this restricts the capability for it to be reliable and to combine the process between partners strongly by an efficient method clearly.

The 2nd approach (this is born to the time of homemade mainframe application) is known as an electronic data exchange (EDI).

Although EDI is the term defined by the large meaning, it has pointed out the business custom most frequently used for the standard of a specific group, art (value-added network, direct dialup, and software mapping (mapping software)), and the electronic data exchanges between companies. In EDI, what collected business information (for example, order of shopping) is read from one application system. It maps in an intermediate format, and it can transmit to a partner via VAN (value-added network), a partner can map in a format suitable for a partner's application, and it can read into a partner's application. Alternatively, direct dialing (direct dialing) can be used instead of VAN. However, EDI is generally batch-oriented.

The customization of a format over which it goes extensively is required, and does not support a process.

The 3rd approach used when a business requirement is not suitable for an EDI model is being designed according to a user's specification and using the mounted custom system. This approach is high-cost, needs the combination of network programming and system integration work, and carries out the specific purpose only for a specific user. This is inflexible and is difficult to change.

Recently, two trends in art changed fundamentally the method that application system can be involved mutually. As a result, not only application of EDI but the 4th and 5th approaches must be added to above three. The 1st trend is a rapid expansion of a network infrastructure. The clearest portion of this infrastructure is connectivity seen to the everywhere provided by the Internet. Almost all organizations are connected to the Internet (or connected soon). The handling of a distributed application is simplified more and the extended set of middleware art and service like a distributed object framework and message inclination middleware which promise the very high compatibility of a software component are combined with this connectivity.

The 2nd trend is related to the progress in the application system for companies used by the company. The important progress in these systems includes progress of an object interface, and progress of the modeling capability of a workflow/process. In the way an object interface exchanges information to application, A method with few burdens is provided more flexibly than a conventional method like the interface of SQL (Structured Query Language) or a file base. The capability for some application vendors to design and mount a workflow in a different application inter module now is provided. The necessity of the company being able to concentrate on easily according to an own business process, and connecting with a business partner's process with this capability becomes clearer.

The clearest effect of the 4th approach for extending interdependence of these trends and business is using World Wide Web (WWW) for the dialog of business versus business. With this model, it is a certain business (business).

\*\*\*\*\* accesses the information belonging to the job application of other companies like a catalog or shipping information by using a standard web browser. However, this approach is not suitable for the business process to which many were extended of needing the dialog for which it depended between the application systems of a different organization.

The 5th approach utilizes the new middleware art which makes it possible to create the distributed application of the high performance integrated logically. It can be used in order to provide the interoperability between the systems between the groups of the application from a vendor which is different in the same art, and in different business, but implementability is restricted by the serious problem. using middleware art for the 1st is a programming task as which remarkable programming skill and the special knowledge over the problem about security, synchronization, and other networks are required.

Although the cost applied to such efforts is justifiable to the vendor in connection with a distributed application, a possibility of investing the capital which the company which desires to participate in the extended specific business process needs in order to build a distributing system from 1 is low.

Finally, there are actually many methods of trying to shift the approach by the conventional EDI mentioned above to an Internet transmission medium in application of EDI called Internet EDI. These methods are carried out in the motivation by the request of liking to reduce the high communication cost relevant to a value-added network (VAN). Substantially, these methods do not almost have a difference with the conventional EDI. A message format, mapping software, and what has even a still the same package (enveloping construct) of structure are used. However, using an open network needs before the special security which was a part of VAN service, reliability, and inspection capability. Use of such extra services in open network composition must be supported by software in the termination of information exchange. Therefore, Internet EDI receives serious restriction like the integrated model which does not gear to lack, the expressive form which is hard to treat, and the new practice method of a process support. In the above-mentioned approach, the increasing demand of liking to mount the complicated automation process which can be maintained safely between intrinsically different systems cannot be met. Therefore, the system and method for designing and controlling the interdependence of the extended business are needed. . Namely, they can be set between the business application systems of (1) existing. setting a focus especially to peer-to-peer communication (dialog) -- (2) -- it being safe, and reliable communication being supported and, (3) Development of custom software is made into the minimum, and it has the function to deal with the data representation form by which (4) unification is not carried out, and has the capability to support the complicated process of reaching within and without the application for (5) companies (for enterprises).

Abstract of an invention This invention is the system and method for generating and performing the process between companies and performing maintenance. The process between companies is the business process or workflow which it share(common use )-turned between the distributed information systems provided with the special preparation for crossing an organizational boundary and automating these processes between the

information systems which are not unified, and was automated.

This system comprises an independent communication subsystem of the plurality called the site provided with common capability. Each site is provided with the server which has a common means for expressing and performing a common process definition. These sites operate in cooperation, while performing the common process between systems. The coordinated message switching between sites which is combined with controlled action of a series limited to each site is contained in execution of a process. Each site can be provided with arbitrary one in many application programs and an operating system in order to perform the process between systems, and an internal process on a server.

The automated process between systems is expressed with the process model of two levels in the system of this invention. A top level, i.e., a common (public) process definition / module, catches the interaction (interaction, dialog) between the independent sites (typically, each expresses an organization or a business unit). An interaction is provided with the communication event by which one site specified by the node within a common process definition transmits the message of a known type to other sites. In this case, a common process definition is a logical group division of the interdependence communication event between 1 set of sites, or directed graph. Each definition specifies the group of a series of effective communication events between participating sites.

In relation to arbitrary common process definitions, there is a low, or a process definition for exclusive use (private) or module from 1 set of those. An individual exclusive process definition is combined with each node of a common process. This exclusive process definition specifies local action with 1 set of possibilities which can be performed at a site, when a specific common process node is performed. An exclusive process definition is defined by the desirable embodiment about composition like a node or operation parameters peculiar to a site, and the interaction of a software application.

The easy explanatory view 1 of a drawing is a block diagram of the extended enterprise system provided with two or more sites which have a common (public) process definition and an exclusive (private) process definition according to this invention.

Drawing 2 is a figure which expresses a node, the arc (arc), and a common process definition including connection between them according to this invention.

Drawing 3 is a flow chart showing the process for performing an exclusive process definition according to this invention.

Drawing 4 is a block diagram of the system according to this invention.

Drawing 5 is a flow chart showing the method for distributing a common process definition according to this invention.

Drawing 6 is a flow chart showing the method for mounting a common process definition according to this invention.

Drawing 7 is a flow chart showing the method for performing an instance specific process type according to this invention.

Drawing 8 is a figure showing the display which shows the graphic user interface for editing a common process definition.

Drawing 9 is a figure showing the display which shows the graphic user interface for editing an exclusive process definition.

The desirable embodiment of the extended system 100 for enterprises is shown in the explanatory view 1 of a desirable embodiment. the desirable operative condition of this invention -- the extended system 100 for enterprises which is twisted like comprises two

or more sites 101, 102, and 103 preferably installed in the individual organization combined by the communication network 104. These sites 101-103 form the extended system 100 for enterprises, and the internal process of each sites 101-103 is combined with the internal process of other sites 101-103 by the coordinated information exchange sequence in this system 100. For example, the sites 101-103 can be made into a company including three elements, i.e., the supplier, manufacturer, and customer of a supply chain. However, it will be understood by the person skilled in the art in the sites 101-103 to the business unit or the function arbitrary type in which arbitrary numbers of sites can exist that the three sites 101-103 are only what was provided as an example.

Each of these sites 101-103 expresses the control zone.

Information is memorized and it is constituted by 1 set of application systems provided with the logic for retrieving and changing the information.

The application of illustration is provided with the group, the product data management (PDM) system, the physical distribution application, and the advanced planning system (APS) of ERP (business resource planning, Enterprise Resource Planning) application. Operation of this invention includes a series of coordinated actions in each site 101-103. These sites are related with a series of coordinated information exchange between the different sites 101-103.

The exchange of information to the application relevant to the sites 101-103 is mainly included in action performed in each site 101-103. Before each information exchange between the sites 101-103, a series of actions happen in a transmitting site, and a series of another actions happen in a receiving site after this information exchange. Therefore, a series of actions peculiar to these sites function as a connection (connector) which combines 1 set of information exchange with a series of coordinated single interactions (dialog).

A series of possible local actions and the exchange between sites are specified by a process definition language. This language can make complicated branching and loop logic possible, and can incorporate the restrictions which control the relation between exchange between sites with the sequence of local action (rule). If it says still more clearly, the desirable process definition language of an embodiment will be provided with a node and the arc element (arc element) combined with the specific command and logic for creating directed graph (it explains below as shown in drawing 2). The single sending agency nodes 205-225 and the single transmission destination nodes 205-225 define each arc element. Each nodes 205-225 are further provided with 1 set of input arcs and the relating logic combined with the nodes 205-225 which precede it, and 1 set of output arcs and the relating logic which combines it with the next nodes 205-225. Although the relation between the input arcs over the predetermined nodes 205-225 is defined by the logic sentence, Each arc is expressed by the individual proposition symbol including the propositional connective (propositional connective) with which this logic sentence performs combination and separation which became a nest depending on the case. The output arc to a predetermined node is associated by the individual logic sentence of an equivalent form. The node 201 does not have an input arc but is called an initiator (start) node. The node 299 does not have an output arc but is called a terminal (termination) node.

In a desirable embodiment, since an action sequence peculiar to a site is expressed as collection of information exchange between sites, the process model of two levels is

used. A common process definition or the module 116a specifies the relation between information exchange between all the sites. The single sites 101 and 102 and the possible action sequence in 103 over the specific node in the common process definition 116a are prescribed by an exclusive process definition or the modules 118a, 118b, and 118c.

A common process definition and the exclusive process definitions 116a, 118a, 118b, and 118c are built by each at the topmost part of the process definition language which has a specific interpretation to the nodes 205-225 and an arc element. In the common process definition 116a, each node element, Expressing the specific sites 101, 102, and 103, each arc element expresses the message which has specific information content transmitted from the sites 101, 102, and 103 expressed by the sending agency node of the arc over the site expressed by the transmission destination node of an arc. The graph to a common process can contain only one start node. In this case, is 11. of common process definition 6a "who does what when" among 1 set of sites 101-103 because of the specific purpose? It specifies. Each common process definition 116a specifies the sequence of 1 set of effective communication events among the participating sites 101, 102, and 103. The same common process definition 116a is given in more detail to each sites 101, 102, and 103 which have action in this common process definition 116a. As shown in drawing 1, each sites 101, 102, and 103 can have one or more one common process definitions 116a of every to each process between sites. In the exclusive process definitions 118a, 118b, and 118c, a node element expresses action based on a specific program, and an arc element specifies an order that these actions are performed. The exclusive process definitions 118a, 118b, and 118c specify how the sites 101-103 build an outgoing message by processing an incoming message. It specifies that the exclusive process definitions 118a, 118b, and 118c happen within the node of the common process definition 116a. Therefore, the exclusive process definitions 118a, 118b, and 118c are provided with the routine and process which these exclusive process definitions 118a, 118b, and 118c were assigned, or suited the specific sites 101, 102, and 103 which operate. In more detail, the exclusive process definitions 118a, 118b, and 118c are designed in order to carry out an interaction using the operating system of the site where it is assigned, application, and a resource.

Therefore, as shown in drawing 1, each exclusive process definitions 118a, 118b, and 118c differ from the thing to each sites 101, 102, and 103. In spite of it, the sites 101, 102, and 103 are similar and are constituted. (For example, it is constituted so that it may have the same operating system, application, and a resource) In a case, these exclusive process definitions 118a, 118b, and 118c can be used or shared. It will be understood by the person skilled in the art that each sites 101, 102, and 103 can be provided with two or more exclusive process definitions 118a, 118b, and 118c as shown in drawing 1. As for two or more of these exclusive process definitions 118a, 118b, and 118c, as opposed to a certain common process definition 116a and as opposed to the different common process definition 116a from it are possible.

This desirable embodiment models the information included in the message to which between the sites 101 and 102 and 103 is transmitted as an object to which structure and operation were restricted. These objects are the receptacles of data and contents with the possibility are prescribed by the object definitions 120a, 120b, and 120c. In a desirable embodiment, the object definitions 120a, 120b, and 120c take the gestalt of XML(extended markup language) DTD (document type definition). As for this



definition, that type of all the objects specify [ meaning of a word ] grammatical form. Refer to the object definitions 120a, 120b, and 120c for both a common process definition and an exclusive process definition.

The typical common process definition 200 is shown in drawing 2. This common process definition 200 is shown by a diagram as a flow chart. Drawing 2 shows the common process definition 200 which specifies 1 set of interactions which may happen between the sites 101-103. The process definition 200 contains 1 set of nodes from 205 to 225, and 1 set of communication events from 230 to 250. Each node corresponds to the specific sites 101-103, and the exclusive process definitions 118a, 118b, and 118c occur in relation to each nodes 205-225 of the common process definition 200. The typical exclusive process definition 300 relevant to the node 210 is shown in drawing 3.

In the common process definition 200, each communication events 230-250 which connect a certain node to other nodes express exchange of the message of a known object type. For example, a known object can be set to arbitrary one out of the business objects of the conventional types, such as a purchase order object and check message objects. Such objects 120a, 120b, and 120c, The object definitions 120a, 120b, and 120c are defined, and by it. Each sites 101, 102, and 103 can use the object definitions 120a, 120b, and 120c if needed of processing an object on the level of either a common level or an exclusive level. That is, the common process definition 200 is a logical group division of the interdependence communication events 230-250 between the sites 101-103, or directed graph, as shown in drawing 1. This group division specifies the sequence of 1 set of effective communication events between the participating sites 101, 102, and 103. Specifically, the common process definition 200 describes the purchase order sent to the site 102 from the site 101 in the communication event 230. This purchase order is generated by the exclusive process of the site 101 relevant to the node 205. The node 210 is a branch node.

The two communication events 235 and 240 are generated by the node. Depending on the specified branch condition, one event in those events or both events occur. The conditions to which the trigger of these two events is carried out are not directed depending on the common process definition 200. It is because it is to know them only the site 102. These conditions are included in the node 210, therefore the exclusive process definition 118b relevant to the site 102. It will be understood by the person skilled in the art that the exclusive process definition 118b can be made into 1 set of exclusive process definitions equivalent to the instance of the common process definition 116a.

By the event 235 and/or generating of 240, the node (one or two nodes) which continues immediately after is performed, a figure goes caudad, and execution advances. The nodes 225 are branching coupling nodes which can wait for one or all the events of the group linked to it. A common process is ended at the termination (terminal) 299 following execution of the node 225.

In relation to each node of 205 to 225 of the common process definition 200, the exclusive process definitions 118a, 118b, and 118c occur. For example, the exclusive process definition 300 relevant to the node 210 is shown in drawing 3. It differs in the common process definition 200, and the contents of the exclusive process definition 300 are determined and recognized by only the corresponding site (in this case, site 102). The exclusive process definition 300 includes many actions (305-330) controlled according to

predetermined logic.

External business application communication, script execution, the notice of a user and recognition, a time lag, output object specification, and subprocess execution are included in action which may happen. All the instances of the exclusive process definition 300 can access the object type "purchase order" contained in the communication event 230. Refer to this object also for action of exclusive process definition 300 throat. The exclusive process definition 300 must generate one object of the types of "an Acknowledgement (Acknowledgement)" or "purchase order" respectively corresponding to the communication events 235 and 240.

One typical embodiment of the exclusive process definition 300 is shown in [drawing 3](#). The exclusive process definition 300 starts by the initiator action 301 performed after the communication event 230 is completed. It will be understood by the person skilled in the art that this process is similar with the thing to other various exclusive process definitions which the exclusive definition corresponding to the node to which an object will follow a communication event if transmitted or received at the sites 101, 102, and 103 starts automatically. The exclusive process 300 continues action 305. Execution of the action 305 is accompanied by sending the information block equivalent to the purchase order which received to the business application 113. If execution of the action 305 is completed, it will shift to the action 310. The action 310 is accompanied by referring to the business application 114 and determining whether there is any stock of the article relevant to purchase order of the communication event 230, or it is commissioned outside. The result of this reference is put in by the variable named "OUTSOURCED" of 1 set of variables relevant to the exclusive process 300. Action 315 is performed following the action 310. The condition test of IF-THEN-ELSE about the value of OUTSOURCED within script action is included in the action 315. It is determined which shall be taken between the course A or the course B by the result of this condition test following completion of the action 315. If the course A is taken, it will progress to the action 320. The action 320 builds the object of the type of an "Acknowledgement" and is accompanied by what is specified as an output of an exclusive process. If the course B is taken, it will progress to the action 325. The action 325 builds the object of the type of "purchase order", and is accompanied by what is specified as an output of an exclusive process. The courses A and B are ended by the action 330. The action 330 is accompanied by notifying the user specified by \*\*\*\* mail of the predetermined status information relevant to the process under operation. This information includes discernment of the feature (index) of purchase order, and the result of business application reference. Ending an exclusive process following execution of the action 330, control returns to a common process level. Especially the thing for which such an exclusive definition is used is advantageous. Because, while uniform control and adjustment of the process between sites are provided by this, The controllers of a specific site are a parameter of a specific site, a resource, and arbitrary methods of following other restrictions, and it is because the maximum pliability by use of the exclusive definition which makes it possible to carry out an exclusive definition is permitted. Each desirable site of an embodiment is provided with the combination of the component which supports the design of a common process and an exclusive process, mounting, and maintenance, and the run time component which supports execution of these processes. The desirable composition of the site 102 as an example is shown in [drawing 4](#).

The standard site 102 comprises the single server 480 and one or more clients 460 and 470 which communicate with a server via the network 409. The clients 460 and 470 and the server 480 operate on a separate host computer. The clients 460 and 470 are provided with the graphic user interfaces (GUI) 465 and 475, respectively. The server 480 is provided with the database 410 and the applications 420 and 430, or can access them. In a desirable embodiment, the database 410 is put on a host computer other than the host computer on which the server 480 is put. The clients 460 and 470 and the server 480 share a common expression of related information by having a dialog via the network 409 according to the specified conventional communications protocol. Expression of such shared information includes a common process definition and an exclusive process definition, an object definition, a processes run history, and the information about other sites where a site has a dialog. The users 440 and 450 have a dialog with the site 102 via GUI465 of a client, and 475, and view, generate and edit expression of the shared information which was able to define the range as mentioned above, and manage. For example, the users 440 and 450 can see and edit the graphic representations of the common process 200 and the exclusive process 300 on GUI465 and 475. One screen of GUI equivalent to the common process definition and the exclusive process definition which were explained to drawing 8 and drawing 9 respectively in relation to drawing 2 and drawing 3 is shown.

The server 480 of a desirable embodiment comprises the interlayer manager set 482, the execution engine 484, the transmission manager (transporter) 486, and the adapters 488 and 489. The interlayer manager set 482 controls access and the flow of the information between the network 409, the engine 484, and the database 410. It carries out related application logic and guarantees the consistency of the information between these components. About the network 409, the manager set 482 mediates access to the information from other components of a client and the server 480 that it is operating simultaneously.

The prior approval of the user 440 or 450 is required for installation of the common process 200 and the exclusive process 300 so that it may explain in detail below. When this recognition is accepted, it is inputted into the client 460 or 470 by the proper user via each GUI. Next, a local installation signal is relayed to the server 480 via the network 409. The manager set 482 which operates according to an input signal starts installation of the process definition to the engine 484. The execution engine 484 transmits during installation the process definition which it receives to the state machine which is saved in the database 410 and which can be performed. This transmission samples all the nodes connected to the arc including the target site from a common process definition. The state machine which was considered as the result and produced includes all the information which needs a single site to participate in execution of the original common process. Completion of installation will give the information on the addition which needs the manager set 482 in order to perform the process which the database 410 memorized or were received from the clients 460 and 470 in it to the engine 484. The durability of shared data is maintained by communication with the database 410.

If installation of the common process definition 200 and the exclusive process definition 300 is completed, the engine 484 will control those execution. The execution engine 484 manages a dialog with two important work, i.e., the input-and-output communication with other sites through the transmission manager 486, and the applications 420 and 430

through the adapters 488 and 489 during execution. The engine 484 manages again some auxiliary work including transmission and reception of the message to the users 440 and 450, and storing of the log information to the database 410 via the manager set 482. The transmission manager 486 manages the communication to the Internet 104 during execution of a common process definition like the definition 200. For example, the common process definition 200 expects transmission or reception of the purchase order 230 and Acknowledgement 245 by the site 102, Acknowledgement 235, and the purchase order 240. As for the manager 486, in this function, it is preferred to process the logic of a retry (based on the attribute of the service which it uses), and an Acknowledgement. A message is generated on the outside of arbitrary specific transport services, and communication security is a message base. The reception to both a source and delivery which is not refused is supported.

The adapters 488 and 489 mediate the data flow between the execution engine 484 and the external application 420 and 430 during execution. For example, if Step 315 of the exclusive process definition 300 is referred to, the engine 484 can transmit a request to the application 420 or 430 which judges whether it is outsourced to the article in question via the adapter 488 or 489. Next, application answers via each adapter. The adapter composition option to 488 and 489 is set up by the maker of an exclusive process to a related site. These adapters 488 and 489 tell the composition option in which those permissions are possible to the interlayer manager set 482 at the time of those installations. With the composition interface to the adapters 488 and 489, an exclusive process, Data can be inserted in external application, data can be searched from external application, or it can ask to the specific event generated by external application (it is heard). Here, it is meant by object definition whether data was inserted, it was searched, or it was asked. The adapters 488 and 489 guarantee the uniform characteristic of a state/consistency management again, and inspect operation between different applications which can be unified to a system. The adapters 488 and 489 map the insertion, the search, and the inquiry to action specified in the exclusive process in a specific dialog with the target applications 420 and 430 during execution of a process.

Operation of the desirable site of an embodiment circulates through a common process definition, the exclusive process of being related, and the life cycle of an object definition. As shown in drawing 5, this cycle begins from creation of a common process definition and the object definition to refer to, next is ended by execution of a process following distribution of a common process definition and an object definition, creation of a required exclusive process definition, and installation of a process.

At Step 502, a user creates a common process definition. The site where the common process definition 200 is created is called an authoring site. Creation of all the object definitions showing the message between sites in a common process definition is included in creation of the common process definition 200. In a desirable embodiment, both a common process definition and an object definition are created by the users 440 and 450 who have a dialog with the manager set 482 via GUI465 of a client, and 475. The user 440 specifies the logic which combines these dialogs with all the participating sites 101 and 102 and the dialog sequence between 103 during creation of the common process definition 200. In this example, GUI465 displays the definition 200 as 1 set of icons connected internally by the flow index (indicator) which looks being the same as that of the figure of drawing 2. Purchase order, an Acknowledgement, and the definition

to refusal OBUJETO are also created by the user 440 via GUI465, if they do not exist a priori.

A user progresses to distribution of a process, after defining a common process and a required object. At Step 504, an authoring site transmits the created common process definition and the object definition referred to to all the sites which participate in a common process via the Internet 104. It will be understood by the person skilled in the art that the Internet 104 can be used the intranet on a Local Area Network (LAN), the Internet on a Wide Area Network (WAN), or what is called the Internet. In this case, the site 102 is an authoring site.

The sites 101 and 103 are participating sites.

In order that the site 102 may transmit the object definition relevant to the common process definition 200 via the Internet, these definitions are transmitted to the transmission manager 486 and the transmission manager of there to a participating site from the manager set 482. If the common process definition 200 and an object definition are received by the transmission manager of a participating site (in this case, sites 101 and 103), those definitions will be passed to an interlayer manager from a transmission manager for the permanent memory to a database. the user of the participating sites 101 and 103 after inspecting the common process definition 200 and object definition which received by GUI of a client -- a common process definition -- recognition -- or it must carry out disapprobatory. This recognition or un-recognizing are sent to an authoring site via the transmission manager of a partner's site. The authoring site 102 is Step 508 and the common process definition 200 waits for the recognition which will be received by the transmission manager 486 or a disapprobatory result, while being inspected at the participating sites 101 and 103. Recognition or un-recognizing by the sites 101 and 103 is not technical concerns, and, probably, expresses business concerns. When a partner's site finds out that the arrangement (commercial arrangement) on the business described by the definition 200 can be permitted, it returns a recognition signal to the authoring site which is the site 102 in this case. When a system inspects about whether all the recognition was acquired and either of the participating site 101 or 103 does not recognize the common process 200 at Step 508, The authoring site 102 distributes a stop message to a partner's sites 101 and 103 via the transmission manager 486, and progresses to Step 510. In this case, the common process definition 200 is canceled and the sites 101, 102, and 103 can enter into negotiation about a new common process definition. At Step 508, when a common process definition is permitted universally, the authoring site 102 distributes the commitment message (commit message) to each of a partner site.

After it is transmitted by the authoring site and a commitment message is received by the participating site, he follows the site of both an authoring site and a participating site to generation of the exclusive process relevant to the common process node which each site owns. This is expressed by Step 514 of drawing 5. The user of each site creates the exclusive process definition to each node of the common process definition relevant to a user's site. For example, the user 400 creates the exclusive process definition 300 to the node 210, and the accompanying exclusive process definition to the node 220. It is because the nodes 210 and 220 are related with the site 102, respectively. Similarly, the user of the site 101 creates the exclusive process definition to the nodes 205 and 225, and, on the other hand, the user of the site 103 creates the definition to the node 215.

After mounting a required exclusive process definition successfully, each participating site transmits the message which shows the completion of mounting of an exclusive process definition to an authoring site. At Step 516, an authoring site is an exclusive process completion signal from all the sites.

It collects. When one of sites fail in mounting of one or more exclusive processes, the site transmits a failure message to an authoring site. In this case, an implementation process is stopped (Step 518) and the process definition 200 is canceled. If an authoring site receives the messages which show that mounting of the exclusive process was completed well from all the participating sites and mounts the exclusive process of itself successfully further, the authoring site can start an installation process (Step 520).

Installation (Step 520) of a process begins from an authoring site transmitting an installation message to all the participating sites. If this installation message is received, each participating site will install a common process locally. Drawing 6 is a single site and is a flow chart showing the process for installing the exclusive process definition relevant to a common process definition. At Step 602, a common process definition and an exclusive related process definition are sent to the execution engine 484 from the manager set 482. At Step 604, a common process definition is compiled in order to create a state machine including the state only over the target site. For example, processing of compile of the common process definition 200 in the site 102 will generate the state relevant to the nodes 210 and 220. The trigger event to each state is memorized by the state machine.

Continue the example of the common process definition 200 and the site 102, The purchase order from the event 230 101, i.e., a site, is recorded, the trigger of the event 245 which are a state relevant to the node 210 and an Acknowledgement from the site 103 is carried out, and the trigger of the state relevant to the node 220 is carried out. Each state of a state machine is combined with an exclusive process definition related by a "call (call)" command at Step 606. For example, the site 102 combines the exclusive process definition 300 with the state relevant to the node 210. I hear that the exclusive process definition 300 is called and performed, and the result of this combination has it, when the trigger of the state relevant to the node 210 is carried out by the purchase order from the site 101. At Step 608, it is judged whether the target site is an initiator of a common process. Like the example of the site 102, if it is not an initiator, execution engine will determine the trigger message which should receive and will register it into a transmission manager. In the example of the site 102, there are two trigger messages called the purchase order 230 from the site 101 and Acknowledgement 245 from the site 103. If a site is an initiator of a common process, the trigger event to the 1st exclusive process is in the inside of the site, will be Step 612 and will be registered as an event trigger, the start-up by which scheduling was carried out, or a trigger of a subprocess. If a common process is installed successfully, each participating site will return an installation confirmation message to an authoring site. At Step 522, an authoring site collects the installation confirmation messages from all the participating sites.

When one of sites are not able to install a common process, the process is stopped by Step 524, as mentioned above. The trigger of the transmission of the message to all the participating sites which show that the common process was installed at all the related sites by success of installation in an authoring site is carried out. As for a process, preparation of execution is completed at this time (Step 526).

As mentioned above, execution of a common process is actually performed by interactive execution of the exclusive process in a partner's site of being related. The situation of execution of the installed common process by a single site is shown in [drawing 7](#). Execution is Step 702 and starts by reception of the message from a partner's site, the event relevant to application, the start-up by which scheduling was carried out, or the start event which can contain the trigger of a subprocess. For example, the trigger of the node 210 of the common process definition 200 is carried out by reception of the purchase order message from the site 101. At Step 704, in a suitable state machine, the execution engine in the site by which the trigger was carried out creates an instance, and the state machine is set as an initial state. At Step 706, execution engine takes out the exclusive process relevant to a related common process node. For example, the exclusive process definition 300 is accessed at the time of the trigger of the node 210. At Step 708, execution engine sends suitable data including the contents of the event 230 to an exclusive process, and starts the execution. An exclusive process is performed at Step 710 and the execution engine operates at data return and Step 712 based on the returned data to execution engine. For example, the exclusive process 300 returns either the command for transmitting an Acknowledgement to the site 101, or purchase order to the site 103 to the execution engine 484. The engine 484 should be cautious of the ability of the applications 420 and 430 to be used during execution of the exclusive process in Step 710. The execution engine 484 answers according to it. The judgment about whether it changed into the state where the common process definition was completed locally, at Step 714 is made with execution engine. This judgment is a local judgment and is limited to the participating site in a common process. For example, completion of the node 220 is the local exit status about the site 102. That is because it is the last node in the process 200 corresponding to the site 102. Similarly, completion of the node 210 can be made into the local exit status over the site 102 depending on the result of the exclusive process of accompanying. If a local end takes place, the common process about the site will be ended at Step 716. Commitment protocol (commit protocol) of two phases is performed between the sites 101 and 102 and 103, and that execution of the process 200 was completed mutually does not complete Step 716 until it is guaranteed. When locally ended at Step 714, a transmission manager waits for the trigger message from a partner's site (Step 718). For example, when the result of the node 210 is transmission of the purchase order in the event 240, the transmission manager 486 waits for the Acknowledgement of the event 245, and does the trigger of the exclusive process relevant to the node 220. If a trigger message is received at Step 720, in Step 722, execution engine will be investigated about the state of the process of being related. Next, as the exclusive process started and mentioned execution above at Step 706, it performs.

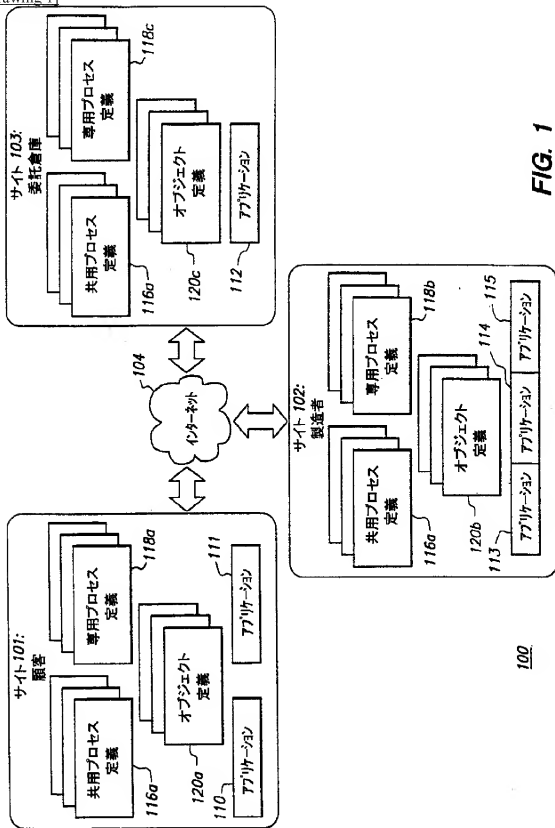


FIG. 1



[Drawing 2]

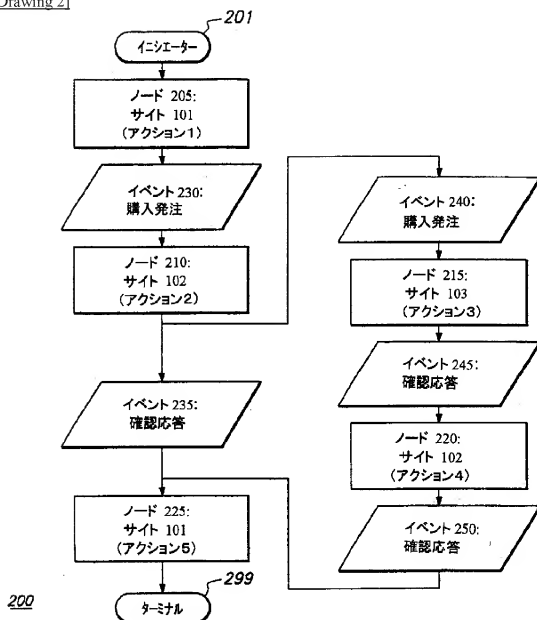


FIG. 2

[Drawing 3]

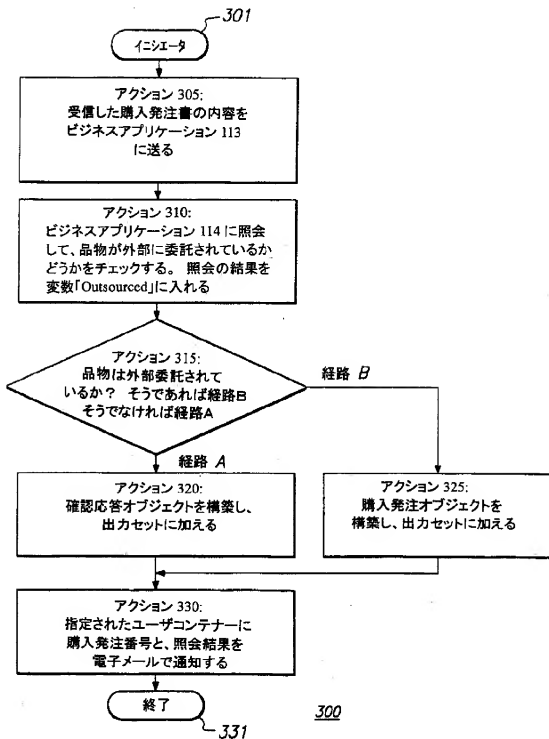
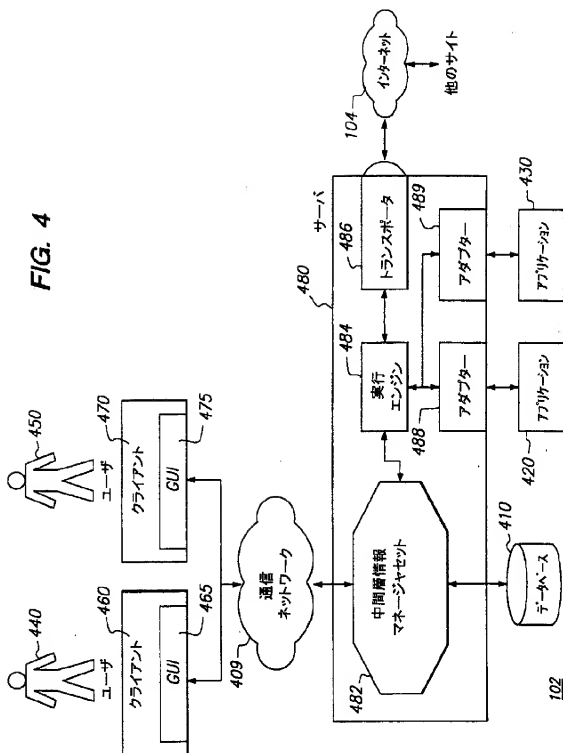


FIG. 3

[Drawing 4]

[Drawing 5]



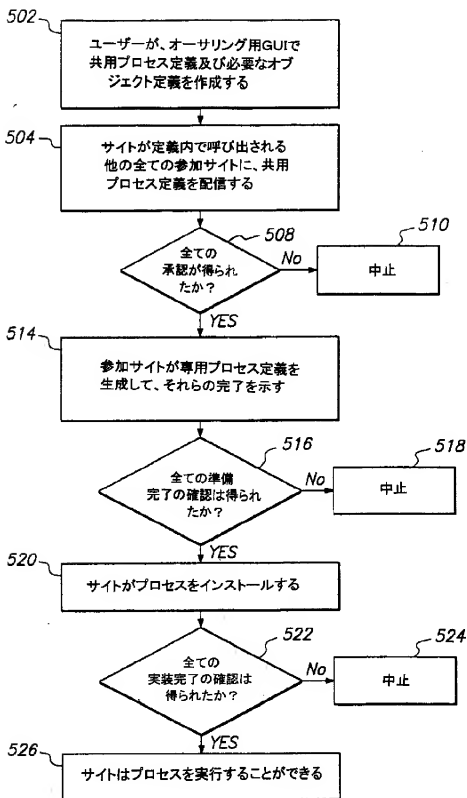


FIG. 5

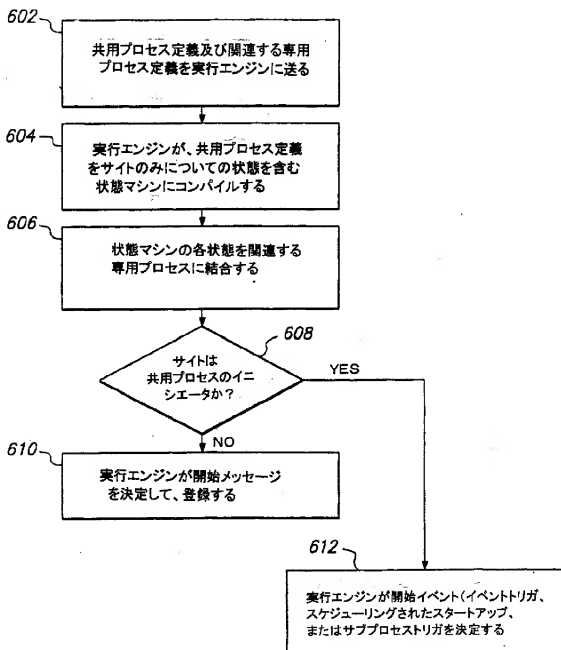


FIG. 6

[Drawing 7]

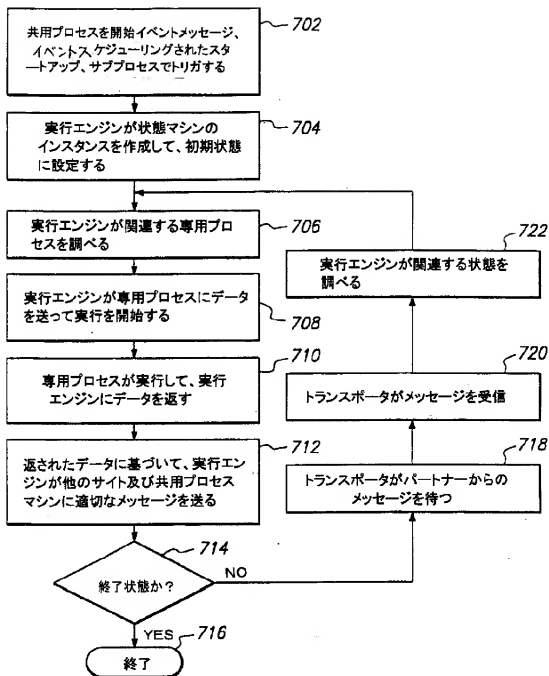


FIG. 7

[Drawing 8]

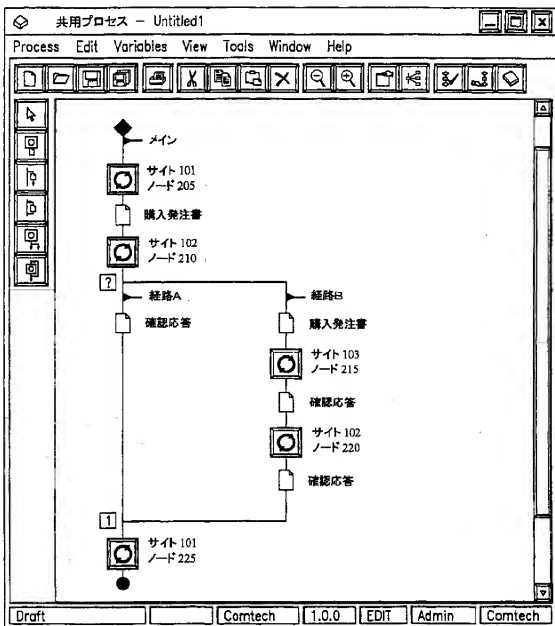


FIG. 8

[Drawing 9]

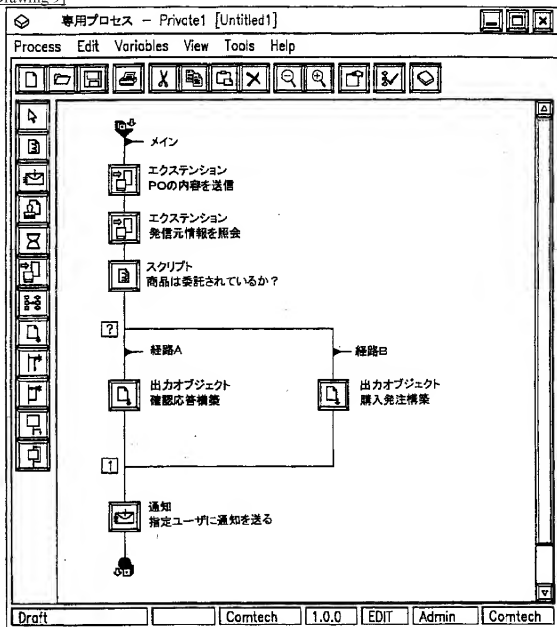


FIG. 9

[Translation done.]